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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/708,219 | 02/17/2004 | Tomoyuki AKIYAMA | 040027 | 2218 |

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| EXAMINER | |
|---|---|
| DIACOU, ARI M | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3663 | |

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/708,219 | AKIYAMA, TOMOYUKI | |
| | Examiner | Art Unit | |
| | Ari M. Diacou | 3663 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *27 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) *7-10* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Invention I, species A and subspecies a in the reply filed on 12-27-2005 is acknowledged.

However, the examiner found that claims 7 and 10 read on a non-elected species ( C ). The elected species does not have the features appearing in claims 7 and 10. Therefore claims 7 and 10 are withdrawn from further consideration.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "current density" in claims 1-3 and 6 is used by the claim to mean "current per unit

length", while the accepted meaning is "current per unit area." The term is indefinite because the specification does not clearly redefine the term. While paragraph [0037] of the USPAP (2004/0196543) defines current density as "The current density means a current per unit length of the active layer. The modal gain coefficient is constant even if the width of the active layer changes, so long as the current per unit length is constant." It is unclear whether the applicant means "length of the active layer" to be in the direction pointing from feature 20A to 20B or feature 8 to 9, similarly it is unclear whether "width of the active layer" to be in the direction pointing from feature 8 to 9 or in a direction into the page.

- In claims 1 and 6, the applicant is claiming an optical amplifier including limitations to both the structure of the device, as well as limitations directed towards the current that is used to pump the device. The examiner finds that the manner in which the applicant claims limitations towards the pumping current makes the claims incompliant with 35 U.S.C. 112 second paragraph. The MPEP states in section 2173 that:

> The primary purpose of this requirement of definiteness of claim language is to ensure that the scope of the claims is clear so the public is informed of the boundaries of what constitutes infringement of the patent.

And in 2173.02:

> If the language of the claim is such that a person of ordinary skill in the art could not interpret the metes and bounds of the claim so as to understand how to avoid infringement, a rejection of the claim under 35 U.S.C. 112, second paragraph, would be appropriate. See *Morton Int'l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1470, 28 USPQ2d 1190, 1195 (Fed. Cir. 1993).

The examiner finds that the claim language does not enable one skilled in the art to understand whether he/she has infringed on the intellectual property defined by claims 1 and 6. The procedure set forth in paragraphs [0065] – [0076] of the USPAP is not just a description of Fig. 4, but also a test for infringement. The examiner contends that this test of infringement would require undue experimentation on the part of a potential infringer in order to determine the metes and bounds of the claimed invention. For example, the potential infringer would have to measure the gain response for the amplifier as a function of the current applied (normalized for the dimensions of the device) and then decide how best to attribute the gain measured to the different relaxation states enumerated in [0067] – [0070], plot the response curves (in a manner that may or may not be the same as that of the applicant), determine the crossing points of these response curves and then see if the currents they applied are higher or lower than the abscissas of given "cross points". Furthermore, the issue of uncertainties has not been mentioned. Would one skilled in the art be infringing if the applicant's "critical abscissa" were within the error bars of the competitor, or if the competitor's "critical abscissa" were within the error bars of the applicant? For these reasons, claims 1, 2 and 6 are held to be indefinite.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. The italicized clauses are essentially method limitations or statements or intended or desired use. Thus, these claims as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference. See In re Pearson, 181 USPQ 641; In re Yanush, 177 USPQ 705; In re Finsterwalder, 168 USPQ 530; In re Casey, 512 USPQ 235; In re Otto, 136 USPQ 458; Ex parte Masham, 2 USPQ 2nd 1647.

See MPEP § 2114 which states:

> A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ 2nd 1647
>
> Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than functions. In re Danly, 120 USPQ 528, 531.
>
> Apparatus claims cover what a device is not what a device does. Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528.

As set forth in MPEP § 2115, a recitation in a claim to the material or article worked upon does not serve to limit an apparatus claim.

6. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Mizutani et al. (USP No. 5946336).

7. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by O'Brien et al. (USP No. 5793521).

8. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Nitta et al. (USP No. 5608572).

9. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Ikeda et al. (USP No. 5224114).

| Claim 1 limitation | Mizutani et al. | O'Brien et al. | Nitta et al. | Ikeda et al. |
|---|---|---|---|---|
| An active layer containing quantum structures of any of quantum dots, quantum wires and quantum dashes, the active layer amplifying light propagating therein while current is injected therein. | [ Fig. 6, #73, #74] | [ Col. 2, lines 10 - ] | [ Col. 9, lines 3b - ] | [ Col. 3A & 3C, lines 4 - ] |
| | [ Col. 11, lines ,12 - 64] | [ Col. 4, lines ,49 - 52] | [ Col. 10, lines ,49 - 54] | [ Col. 6, lines ,3 - 57] |
| Electrodes provided for a plurality of sections of the active layer sectionalized along a light propagation direction, the electrodes being able to inject different currents into the sections. | [ Fig. 6, #79, #80] | [ Fig. 2, #41, #42] | [ Fig. 9, #8, #9] | [ Fig. 3A, #7a, #7b] |
| | [ Col. 12, lines 26 - 34] | [ Col. 4, lines 52 - 55] | [ Col. 10, lines 59 - 65] | [ Col. 7, lines 35 - 40] |
| A power supply for supplying current to the electrodes in such a manner that a first current density is set to at least one section of the active layer and a second current density is set to at least another section | Since all authors make mention of current being applied to the devices, t is regarded as inherent that these devices have a power supply not shown in the figures. | | | |
| | [ Col. 12, lines ,34 - 39] | [ Col. 4, lines 52 - 61] | [ Col. 12, lines 1 - 14] | [ Col. 7, lines 49 - 59] |
| The first current density being lower than a current density at a cross point and the second current density being higher than the current density at the cross point, the cross point being a cross point between gain coefficient curves at least two different transition wavelengths of the quantum structures, the curves being drawn in a graph showing a relation between a density of current injected into the active layer and a gain coefficient of the active layer. | The examiner asserts that the currents supplied to these inventions read on the claim limitation. The burden of proof is on the applicant to apply the infringement analysis described by the examiner in paragraph 3 of this office action and prove that these inventions do not read on the applicant's claim limitation. | | | |

| Claim 3 limitation | Mizutani et al. | O'Brien et al. | Nitta et al. | Ikeda et al. |
|---|---|---|---|---|
| An active layer containing a quantum structure of any of quantum dots, quantum wires and quantum dashes, the active layer amplifying light propagating therein while current is injected therein | [ Fig. 6, #73, #74] | [ Col. 2, lines 10 - ] | [ Col. 9, lines 3b - ] | [ Col. 3A & 3C, lines 4 - ] |
| | [ Col. 11, lines ,12 - 64] | [ Col. 4, lines ,49 - 52] | [ Col. 10, lines ,49 - 54] | [ Col. 6, lines ,3 - 57] |
| Electrodes provided for a plurality of sections of the active layer sectionalized along a light propagation direction, each section belonging to a group selected from at least two groups, and the electrodes injecting different currents into the sections. | [ Fig. 6, #79, #80] | [ Fig. 2, #41, #42] | [ Fig. 9, #8, #9] | [ Fig. 3A, #7a, #7b] |
| | [ Col. 12, lines 26 - 34] | [ Col. 4, lines 52 - 55] | [ Col. 10, lines 59 - 65] | [ Col. 7, lines 35 - 40] |
| A power supply *for supplying current to the electrodes in such a manner that a first current density is set to at least one section of the active layer and a second current density is set to at least another section.* | Since all authors make mention of current being applied to the devices, t is regarded as inherent that these devices have a power supply not shown in the figures. | | | |
| | [ Col. 12, lines ,34 - 39] | [ Col. 4, lines 52 - 61] | [ Col. 12, lines 1 - 14] | [ Col. 7, lines 49 - 59] |

10. Claims 2, 4, 5 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Ikeda et al. (USP No. 5224114).

- Regarding claim 2, Ikeda discloses the semiconductor optical amplifier according to claim 1, wherein at least two sections are disposed to which current is supplied at the first current density, at least two sections are disposed to which current is supplied at the second current density, and one of the two sections to which current is supplied at the second current density is disposed between the two sections to which current is supplied at the first current density. [In the case where Ia1 = Ia2 ≠ ID, then 121 and 122 form a first section, and 13 forms the second section, and reads on claim 2 of the instant application]

- Regarding claim 4, Ikeda discloses the semiconductor optical amplifier according to claim 3, wherein between two sections belonging to the same group, one section per each of all the groups different from the aforementioned same group is disposed. [In the case where Ia1 = Ia2 ≠ ID, then 121 and 122 form a first section, and 13 forms the second section, and reads on claim 2 of the instant application, and therefore, section two is disposed between two first sections.]
- Regarding claim 5, Ikeda discloses the semiconductor optical amplifier according to claim 3, wherein two groups are provided and a section belonging to one group and a section belonging to the other group are alternately disposed. [In the case where Ia1 = Ia2 ≠ ID, then 121 and 122 form a first section, and 13 forms the second section, and reads on claim 2 of the instant application, and therefore, section two is disposed between two first sections.]
- Regarding claim 6, Ikeda discloses the semiconductor optical amplifier according to claim 3, wherein the power supply supplies current to the electrodes in such a manner that a first current density is set to each section belonging to at least one group and a second current density is set to each section belonging to at least another group, the first current density being lower than a current density at a cross point and the second current density being higher than the current density at the cross point, the cross point being a cross point between gain coefficient curves at least two different transition

wavelengths of the quantum structure, the curves being drawn in a graph showing a relation between a density of current injected into the active layer and a gain coefficient of the active layer. [The examiner asserts that the currents supplied to these inventions read on the claim limitation. The burden of proof is on the applicant to apply the infringement analysis described by the examiner in paragraph 3 of this office action and prove that these inventions do not read on the applicant's claim limitation.]

***Conclusion***

11. While patent drawings are not drawn to scale, relationships clearly shown in the drawings of a reference patent cannot be disregarded in determining the patentability of claims. See In re Mraz, 59 CCPA 866, 455 F.2d 1069, 173 USPQ 25 (1972).

12. The references made herein are done so for the convenience of the applicant. They are in no way intended to be limiting. The prior art should be considered in its entirety.

13. The prior art which is cited but not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ari M. Diacou whose telephone number is (571) 272-5591. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMD 1/19/2006

Mark Hellner
Primary Examiner
AU 3663